

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application.

Listing of Claims:

1 Claim 1. (*Original*) A network management system comprising: a communication
2 network having a first edge node serving as an entrance unit to said network for a transfer signal
3 passing through said network, a second edge node serving as an exit unit used to send out said
4 transfer signal from said network to an outside and a relay node being mounted between said first
5 edge node and said second edge node and on a transfer route extending from said first node to
6 said second node; a path information acquiring unit being connected to said first edge node and
7 second edge node so as to be communicable with said first and second edge nodes and being
8 used to send out a tracing signal used to trace said transfer signal along said transfer route on
9 which said transfer signal has passed, to said first edge node, and being used to acquire
10 information about a path through which said transfer signal passes; and wherein each of said
11 nodes is made up of a path information holding unit used to hold information about said path
12 through which said transfer signal passes, a tracing signal residing unit used to make said tracing
13 signal be resident when having received said tracing signal and to produce a replica of said
14 tracing signal and a tracing signal transmitting unit used to feed said replica of said tracing signal
15 to said nodes being adjacent to each other on said transfer route and wherein said path
16 information acquiring unit used to acquire said information about said path on said transfer route

17 for said transfer signal extending from said first edge node to said second edge node, from one
18 node out of a plurality of said nodes.

1 Claim 2. (*Original*) The network management system according to claim 1, wherein said
2 path information holding unit is used to insert said path information into said tracing signal being
3 resident in said node having said path information holding unit.

1 Claim 3. (*Original*) The network management system according to claim 1, wherein said
2 path information holding unit holds said path information so as to be associated with said tracing
3 signal which resides in said node having said information holding unit.

1 Claim 4. (*Original*) The network management system according to claim 1, wherein said
2 path information acquiring unit feeds information collecting signal used to collect said path
3 information being held by each of said nodes on said transfer route for said transfer signal, to
4 said first edge node.

1 Claim 5. (*Original*) The network management system according to claim 4, wherein each
2 of said nodes further comprises an information collecting signal processing sending unit used to
3 insert, when having received said information collecting signal, said path information being held
4 by said information collecting signal processing sending unit, into said information collecting

5 signal and used to feed said collecting signal to said nodes being adjacent to each other on said
6 transfer route.

1 Claim 6. (*Original*) The network management system according to claim 1, wherein said
2 path information acquiring unit receives said path information for said transfer route of said
3 transfer signal extending from said first edge node through said relay node to said second edge
4 node, from said second edge node.

1 Claim 7. (*Original*) The network management system according to claim 5, wherein said
2 path information acquiring unit receives said information collecting signal fed from said first
3 edge node through said relay node to said second edge node, from said second edge node.

1 Claim 8. (*Original*) The network management system according to claim 1, wherein said
2 path information held by said path information holding unit contains information about paths
3 leading to said node having said path information holding unit and wherein said path information
4 acquiring unit acquires all path information for said transfer signal by receipt of said tracing
5 signal having said path information from said second edge node.

1 Claim 9. (*Original*) The network management system according to claim 1, wherein said
2 path information acquiring unit is a network management unit and wherein said network
3 management unit feeds said tracing signal to said first edge node.

1 Claim 10. (*Original*) The network management system according to claim 4, wherein
2 said path information acquiring unit is a network management unit and wherein said network
3 management unit feeds said information collecting signal to said first edge node.

1 Claim 11. (*Original*) The network management system according to claim 1, wherein a
2 user terminal serving as a sender of said transfer signal is connected to said first edge node and
3 wherein said network management unit acquires said path information in accordance with an
4 instruction fed from said user terminal.

1 Claim 12. (*Original*) The network management system according to claim 1, wherein
2 said path information acquiring unit is a user terminal serving as a sender of said transfer signal
3 and being connected to said first edge node and wherein said user terminal feeds said tracing
4 signal to said first edge node.

1 Claim 13. (*Original*) The network management system according to claim 4, wherein
2 said path information acquiring unit is a user terminal serving as a sender of said transfer signal
3 and being connected to said first edge node and wherein said user terminal feeds said
4 information collecting signal to said first edge node.

1 Claim 14. (*Original*) The network management system according to claim 1, wherein
2 said network is of a connectionless-mode communication type.

1 Claim 15. (*Original*) The network management system according to claim 1, wherein
2 each of said signals is handled in a form of a packet and wherein said tracing packet has a tracing
3 processing program to trace said transfer packet and wherein said path information acquiring unit
4 sends out a quality control packet having a program to control a quality of communications in
5 each of said nodes and a driving packet having a driving program to start said control program
6 contained in said quality control packet, to said first edge node.

1 Claim 16. (*Original*) The network management system according to claim 15, wherein
2 said path information acquiring unit simultaneously sends out said tracing packet and said
3 quality control packet.

1 Claim 17. (*Original*) The network management system according to claim 15, wherein
2 said tracing signal residing unit is made up of a first storing section to store said tracing packet
3 fed from said path information acquiring unit and a first packet executing section to execute said
4 program contained in said tracing processing packet in said first storing section and to insert said
5 path information in said transfer packet into said tracing packet and wherein said tracing signal
6 sending unit has a first packet sending section used to feed said tracing packet into which said
7 path information has been inserted by said first packet executing section and said quality control
8 packet fed from said path information acquiring unit, to said nodes being adjacent to each other
9 on said transfer route for said transfer packet and wherein each of said nodes is further provided
10 with a second storing section used to store said quality control packet, a third storing section
11 used to store said driving packet fed from said path information acquiring unit, a third packet
12 executing section used to execute said program contained in said driving packet in said third
13 storing section and to produce a driving instruction to start said program contained in said quality
14 control packet in said second storing section, a second packet executing section used to execute
15 said quality control program driven by said driving instruction and to control said
16 communication quality and a second packet sending section used to feed said driving packet to
17 said nodes being adjacent to each other on said transfer route for said transfer packet.

1 Claim 18. (*Original*) The network management system according to claim 17, wherein
2 said path information acquiring unit receives said tracing packet, said quality control packet and
3 said driving packet fed to said second edge node from said first edge node through said relay
4 node, from said second edge node.

1 Claim 19. (*Original*) The network management system according to claim 17, wherein
2 said second packet executing section acquires results from said quality control processing.

1 Claim 20. (*Original*) The network management system according to claim 19, wherein
2 said path information acquiring unit feeds an information collecting packet containing an
3 information collecting program used to collect said path information being held by each of said
4 nodes on said transfer route for said transfer packet, to said first edge node.

1 Claim 21. (*Original*) The network management system according to claim 20, wherein
2 said third storing section stores said information collecting packet fed from said path information
3 acquiring unit and wherein said third packet executing section executes said collecting program
4 contained in said information collecting packet in said third storing section and inserts
5 information about results from said communication quality control into said information

6 collecting packet and wherein said second packet sending section feeds said information
7 collecting packet to said nodes being adjacent to each other on said transfer route.

1 Claim 22. (*Original*) The network management system according to claim 21, wherein
2 said path information acquiring unit receives said information collecting packet fed from said
3 first edge node through said relay node to said second edge node, from said second edge node.

1 Claim 23. (*Original*) The network management system according to claim 18, wherein
2 said path information acquiring unit is a network management unit.

1 Claim 24. (*Original*) The network management system according to claim 22, wherein
2 said path information acquiring unit is a network management unit.

1 Claim 25. (*Original*) The network management system according to claim 23, wherein a
2 communication server or a user terminal serving as a sender of said transfer signal is connected
3 to said first edge node and wherein said network management unit sends out said tracing
4 processing packet, said quality control packet and said driving packet in accordance with an
5 instruction fed from said server or said user terminal.

1 Claim 26. (*Original*) The network management system according to claim 25, wherein
2 said network management unit sends out said information collecting packet in accordance with
3 an instruction fed from said server or said user terminal.

1 Claim 27. (*Original*) The network management system according to claim 15, wherein
2 said path information acquiring unit is a communication server being connected to said first edge
3 node or a user terminal serving as a sender of said transfer signal being connected to said first
4 edge node.

1 Claim 28. (*Original*) The network management system according to claim 20, wherein
2 said path information acquiring unit is a communication server being connected to said first edge
3 node or a user terminal serving as a sender of said transfer packet being connected to said first
4 edge node.

1 Claim 29. (*Original*) The network management system according to claim 17, wherein
2 said network is of a connectionless-mode communication type.

1 Claim 30. (*Original*) The network management system according to claim 1, wherein
2 each of said signals is handled in a form of a packet and wherein said tracing packet has a tracing
3 processing program to trace said transfer packet and wherein said path information acquiring unit

4 sends out a filtering processing packet containing a filtering processing program to select a
5 transfer packet fed from said each of nodes based on a predetermined condition and a driving
6 packet having a driving program to start said program contained in said processing packet, to
7 said first edge node.

1 Claim 31. (*Original*) The network management system according to claim 30, wherein
2 said path information acquiring unit simultaneously sends out said tracing packet and said
3 filtering processing packet.

1 Claim 32. (*Original*) The network management system according to claim 30, wherein
2 said tracing signal residing unit is provided with a first storing section used to store said tracing
3 packet fed from said path information acquiring unit and with a first packet executing section
4 used to execute said processing program contained in said tracing packet in said first storing
5 section and to insert said path information in said transfer packet into said tracing packet and
6 wherein said tracing signal sending unit is provided with a first packet sending section used to
7 feed said tracing packet into which said path information has been inserted by said first packet
8 executing section and said transfer packet fed from said path information acquiring unit to said
9 nodes being adjacent to each other on said transfer route for said transfer packet and wherein
10 each of said nodes is further provided with a second storing section used to store said filtering
11 processing packet, with a third storing section used to store said driving packet fed from said
12 path information acquiring unit, with a third packet executing section used to execute said

13 driving program contained in said driving packet in said third storing section and to produce a
14 driving instruction to start said program contained in said filtering processing packet in said
15 second storing section, with a second packet executing section used to execute said filtering
16 processing program driven by said driving instruction and to perform said filtering processing
17 and with a second packet sending section used to feed said driving packet to said nodes being
18 adjacent to each other on said transfer route for said transfer packet.

1 Claim 33. (*Original*) The network management system according to claim 32, wherein
2 said second packet executing section acquires information about results from said filtering
3 processing.

1 Claim 34. (*Original*) The network management system according to claim 33, wherein
2 said path information acquiring unit feeds an information collecting packet having an
3 information collecting program to collect said path information being held by each of said nodes
4 on said transfer route for said transfer packet, to said first edge node.

1 Claim 35. (*Original*) The network management system according to claim 34, wherein
2 said third storing section stores said information collecting packet fed from said path information
3 acquiring unit and wherein said third packet executing section executes said collecting program
4 contained in said information collecting packet in said third storing section and inserts

5 information about results from said filtering processing into said information collecting packet
6 and wherein said second packet sending section feeds said information collecting packet to said
7 nodes being adjacent to each other on said transfer routes.

1 Claim 36. (*Original*) The network management system according to claim 35, wherein
2 said path information acquiring unit receives said information collecting packet fed to said
3 second edge node from said first edge node through said relay node, from said second edge node.

1 Claim 37. (*Original*) The network management system according to claim 30, wherein
2 said path information acquiring unit is a network management unit and wherein said network
3 management unit has a first packet producing and transmitting section used to produce said
4 tracing packet and said filtering processing packet and to send out both said packets and a second
5 packet producing and transmitting section used to said driving packet and to send out said
6 driving packet and wherein, after said tracing processing packet and said filtering packet have
7 been sent out from said first packet producing and transmitting section, said driving packet is
8 transmitted from said second packet producing and transmitting section.

1 Claim 38. (*Original*) The network management system according to claim 34, wherein
2 said path information acquiring unit is a network management unit and wherein said network
3 management unit is provided with a first packet producing and transmitting section used to
4 produce said tracing packet and said filtering processing packet and to send out said both

5 packets, with a second packet producing and transmitting section used to produce said driving
6 packet and to send out said produced driving packet and with a third packet producing and
7 transmitting section used to produce said information collecting packet and to send out said
8 produced information collecting packet and wherein, after said tracing processing packet and
9 said filtering processing packet have been sent out from said first packet producing and
10 transmitting section, said driving packet is sent out from said second packet producing and
11 transmitting section and, after said transmission of said driving packet, said information
12 collecting packet is sent out from said third packet producing and transmitting section and said
13 information collecting packet fed to said second edge node through said relay node from said
14 first edge node is received from said second edge node.

1 Claim 39. (*Original*) The network management system according to claim 37, wherein a
2 communication server or a user terminal serving as a sender of said transfer signal is connected
3 to said first edge node and wherein said network management unit sends out said tracing
4 processing packet, said filtering processing packet and said driving packet in accordance with an
5 instruction fed from said communication server or said user terminal.

1 Claim 40. (*Original*) The network management system according to claim 38, wherein a
2 communication server or a user terminal serving as a sender of said transfer signal is connected
3 to said first edge node and wherein said network management unit sends out said tracing

4 processing packet, said filtering processing packet, said driving packet and said information
5 collecting packet in accordance with an instruction fed from said communication server and user
6 terminal.

1 Claim 41. (*Original*) The network management system according to claim 30, wherein
2 said path information acquiring unit is a communication server being connected to said first edge
3 node or a user terminal serving as a sender of said transfer signal being connected to said first
4 edge node.

1 Claim 42. (*Original*) The network management system according to claim 36, wherein
2 said path information acquiring unit is a communication server being connected to said first edge
3 node or a user terminal serving as a sender of said transfer signal being connected to said first
4 edge node.

1 Claim 43. (*Original*) The network management system according to claim 32, wherein
2 said network is of a connectionless mode communication type.

1 Claim 44. (*Original*) The network management system according to claim 1, wherein
2 each of said signals is handled in a form of a packet and wherein said tracing packet has at least a
3 tracing processing program to trace said transfer packet and wherein said path information
4 acquiring unit sends out a Service Level Agreement (SLA) management packet having a

5 program to manage said SLA processing and check as to whether predetermined service is
6 maintained in accordance with said SLA already agreed in advance between said network
7 manager and a user and information collecting packet having an information collecting program
8 to collect said path information held by each of said nodes on said transfer route for said transfer
9 packet, to said first edge node.

1 Claim 45. (*Original*) The network management system according to claim 44, wherein
2 said path information acquiring unit simultaneously sends out said tracing packet and said SLA
3 packet.

1 Claim 46. (*Original*) The network management system according to claim 44, wherein
2 said tracing signal residing unit is provided with a first storing section used to store said tracing
3 packet fed from said path information acquiring unit and with a first packet executing section
4 used to execute said processing program contained in said tracing packet in said first storing
5 section and to insert said transfer information in said transfer packet into said tracing packet and
6 wherein said tracing signal sending unit has a first packet sending section used to feed said
7 tracing packet into which said path information has been inserted by said first packet executing
8 section and said SLA management packet fed from said path information acquiring unit to said
9 nodes being adjacent to each other on said transfer route for said transfer packet and wherein
10 each of said nodes is further provided with a second storing section used to store said SLA

11 management packet, with a second packet executing section used to execute said management
12 program contained in said SLA management packet in said second storing section and to acquire
13 information about results form transfer management of said transfer packet, with a third storing
14 section used to store said information collecting packet fed from said path information acquiring
15 unit, with a third packet executing section used to execute said collecting program contained in
16 said information collecting packet in said third storing section and to insert information about
17 results from management obtained from said second packet executing section into said
18 information collecting packet and with a second packet sending section used to feed said
19 information collecting packet into which information about said management results is inserted
20 by said third packet executing section to said nodes being adjacent to each other on said transfer
21 route for said transfer packet.

1 Claim 47. (*Original*) The network management system according to claim 46, wherein
2 said second storing section stores said information about results from said management obtained
3 by said second packet.

1 Claim 48. (*Original*) The network management system according to claim 46, wherein
2 said third packet executing section inserts said packet information contained in said transfer
3 packet into said information collecting packet.

1 Claim 49. (*Original*) The network management system according to claim 46, wherein
2 said path information collecting unit receives said information collecting packet fed to said
3 second edge node through said relay node from said first edge node, from said second edge node.

1 Claim 50. (*Original*) The network management system according to claim 44, wherein
2 said path information acquiring unit, when having judged, based on predetermined conditions,
3 that said transfer route for said transfer packet is put in a congestion state, sends out a congestion
4 avoiding packet having a program to reduce said congestion state so that said transfer packet is
5 able to avoid said congestion.

1 Claim 51. (*Original*) The network management system according to claim 50, wherein
2 said third storing section stores said congestion avoiding packet fed from said path information
3 acquiring unit and wherein said third packet executing section executes said congestion avoiding
4 program contained in said congestion avoiding packet in said third storing section and wherein
5 said second packet sending section feeds said congestion avoiding packet to said nodes being
6 adjacent to each other on said transfer route.

1 Claim 52. (*Original*) The network management system according to claim 51, wherein
2 said path information acquiring unit receives said congestion avoiding packet fed to said second
3 edge node through said relay node from said first edge node, from said second edge node.

1 Claim 53. (*Original*) The network management system according to claim 49, wherein
2 said path information acquiring unit is a network management unit and wherein said network
3 management unit is provided with a first packet producing and transmitting section used to
4 produce said tracing packet and said SLA management packet and to send said both produced
5 tracing processing packet and SLA management packets, with a second packet producing and
6 transmitting section used to produce said information collecting packet and to send out said
7 produced packet and with a first packet receiving section to receive said information collecting
8 packet and wherein, after said transmission of said tracing processing packet and said SLA
9 management packet from said first packet producing and transmitting section, said information
10 collecting packet is sent out from said second packet producing and transmitting section.

1 Claim 54. (*Original*) The network management system according to claim 52, wherein
2 said path information acquiring unit is a network management unit and wherein said network
3 management unit is provided with a first packet producing and transmitting section used to
4 produce said tracing packet and said SLA management packet and to send out said both packets,
5 with a second packet producing and transmitting section used to produce said information
6 collecting packet and to send out said produced packet, with a third packet producing and
7 transmitting section used to produce said congestion avoiding packet and to send out said
8 produced packet, based on said predetermined conditions, and with a second packet receiving
9 section used to receive said information collecting packet and said congestion avoiding packet

10 and wherein, after transmission of said tracing processing packet and said SLA management
11 packet from said first packet producing and transmitting section, said information collecting
12 packet is sent out from said second packet producing and transmitting section and, after said
13 transmission of said information collecting packet, said congestion avoiding packet is sent out,
14 whenever necessary, from said third packet producing and transmitting section.

1 Claim 55. (*Original*) The network management system according to claim 54, wherein
2 said predetermined condition for said congestion avoiding packet is that said information
3 collecting packet is not supplied to said path information acquiring unit within a fixed time.

1 Claim 56. (*Original*) The network management system according to claim 53, wherein a
2 communication server or a user terminal serving as a sender of said transfer signal is connected
3 to said first edge node and wherein said network management unit, based on an instruction fed
4 from said server or user terminal, sends out said tracing processing packet, said SLA
5 management packet and said information collecting packet.

1 Claim 57. (*Original*) The network management system according to claim 54, wherein a
2 communication server or a user terminal serving as a sender of said transfer signal is connected
3 to said first edge node and wherein said network management unit, based on an instruction fed

4 from said server or user terminal, sends out said tracing processing packet, said SLA
5 management packet, said information collecting packet and said congestion avoiding packet.

1 Claim 58. (*Original*) The network management system according to claim 46, wherein
2 said third packet executing section inserts information about time when execution of said
3 information collecting program has started and about time when running of said information
4 collecting program has ended, into information about results from said management.

1 Claim 59. (*Original*) The network management system according to claim 49, wherein
2 said SLA management unit used to manage said SLA is connected to said path information
3 acquiring unit and wherein said path information acquiring unit, based on said management
4 result information being stored in said information collecting packet fed from said second edge
5 node and on unit information being able to be obtained for every unit of predetermined
6 information about said management results, produces information about a return to a user of said
7 network and feeds said information about said returns to said SLA management unit.

1 Claim 60. (*Original*) The network management system according to claim 54, wherein
2 said network management unit inserts information about a first time showing time when said
3 third packet producing and transmitting section has transmitted said congestion avoiding packet,
4 into said congestion avoiding packet and information about a second time showing time when

5 said second packet receiving section has received said congestion avoiding packet, into said
6 congestion avoiding packet.

1 Claim 61. (*Original*) The network management system according to claim 60, wherein
2 said LSA management unit used to control said SLA is connected to said network management
3 unit and wherein said network management unit, based on information about a third time
4 showing a difference between said first time and said second time contained in said congestion
5 avoiding packet having received by said second packet receiving section and on unit time
6 information obtained for every predetermined information unit of said third time information,
7 produces information about said return for a user of said network and feeds said information
8 about said return to said SLA management unit.

1 Claim 62. (*Original*) The network management system according to claim 46, wherein
2 said network is of a connectionless mode communication type.

1 Claim 63. (*Original*) A node for being used in a communication network which is
2 mounted on a transfer route for a transfer signal passing through said network and which
3 receives a tracing signal used to trace said transfer signal and which stores information about a
4 path on said transfer route for said transfer signal, comprising: a path information holding unit to
5 hold information about said path for said transfer signal passing through said path information
6 holding unit; a tracing signal residing unit, when having said tracing signal, to cause said tracing

- 7 signal to be resident in said tracing signal residing unit and to produce a replica of said tracing
- 8 signal; and a tracing signal sending unit to feed said replica of said tracing signal to nodes being
- 9 adjacent to each other on said transfer route for said transfer signal.

Claim 64 (*Canceled*)